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AUTHOR Ceaser, Lisbeth
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ABSTRACT

A study investigated the transfer effect of three different word recognition strategies. Subjects were 90 first- through fourth-grade children randomly drawn from an elementary school population to serve in the experimental group and a like number assigned to a non-instructed control group. Strategies taught to subjects were a graphophonic strategy that featured the use of letter-sound regularities; a structural strategy that relied upon knowledge of base words and inflected endings; and a contextual strategy that called for both syntactical and semantic clues in learning to recognize unfamiliar words. A word recognition test was developed and administered as a pre- and posttest. Items were stratified as words most likely to be recognized either by graphophonic, structural, or contextual strategies. Results indicated significant differences between experimental and control groups following instruction in each of the three strategies with the experimental group achieving double that of the control group. Findings suggest that the teaching of multiple word recognition strategies is effective in improving the word recognition skills of young readers, and that the teaching of these strategies be included in the content of reading methods courses at California Polytechnic State University at San Luis Obispo. (Contains 11 references and 3 tables of data. The Transfer Effect Decoding Test is attached.) (Author/RS)

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ED 384 022

TRANSFER EFFECT OF WORD RECOGNITION STRATEGIES

Research Methodology

by

Lisbeth Ceaser

California Polytechnic State University

San Luis Obispo

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A practicum report presented to Nova University
in partial fulfillment of the requirements
for the degree of Doctor of Education

Nova University

June 1991

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TRANSFER EFFECT OF WORD RECOGNITION

by

Lisbeth Ceaser

June 1991

This study approached the problem of validating the teaching of word recognition strategies as content in a program for the preparation of teachers of reading through the design and conduct of an experimental study.

The purpose of the study was to investigate the transfer effect of three different word recognition strategies. The specific hypothesis was that pupils taught multiple-word recognition strategies would recognize more unknown printed words when compared with pupils who were not taught these strategies. The strategies were (a) a graphophonic strategy that featured the use of letter-sound regularities, (b) a structural strategy that relied upon knowledge of base words and inflected endings, and (c) a contextual strategy that called for both syntactical and semantic clues in learning to recognize unfamiliar words.

Ninety children were randomly drawn from an elementary school population to serve in the experimental group and a like number were assigned to a non-instructed control group.

A word recognition test was developed and administered to those in both groups. This test served as both a pre-test and as an achievement test following lessons teaching the strategies to the experimental group. All items on the test were transfer items; none of the items appeared in the instructional treatment. The items were stratified as words most likely to be recognized either by graphophonic, structural, or contextual strategies.

A significant difference was found between the experimental and control groups following instruction in each of the three strategies with the experimental group achieving double that of the control group.

Thus it was concluded that the teaching of multiple word recognition strategies is effective in improving the word recognition skills of young readers, and it is recommended that the teaching of these strategies be included in the content of reading methods courses at California Polytechnic State University at San Luis Obispo.

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Chapter 1

INTRODUCTION

Background and Significance

The University Center for Teacher Education at California Polytechnic State University in San Luis Obispo offers courses and programs leading to careers in elementary teaching and reading specializations. A major task encountered by teachers, especially those responsible for teaching word recognition, is that of selecting effective instructional strategies to meet the needs of students with diverse learning backgrounds and styles. Customarily, teachers inherit materials, attitudes, and methods of instruction from existing practice. They are unable to take the time to investigate the effectiveness of one strategy over another.

One such instructional issue centers on the value of teaching beginning pupils of reading several strategies for decoding printed words. Teachers are unclear about whether (a) to emphasize a strategy aimed at revealing the regular patterns of letter-sound relations in English (a graphophonic strategy) or (b) to introduce a strategy that gives clues to word recognition focusing on the structure of the word, such as its root or base (a structural strategy) or (c) to teach

a strategy whereby learners attempt to recognize printed words from context clues (a contextual analysis strategy).

The purpose of this study was to investigate the transfer effect produced by the three different word recognition strategies, that is to see whether each was important in recognizing particular categories of words and whether or not training in one strategy might help learners recognize printed words in several categories. As indicated in the review of the literature, there is little empirical evidence regarding this instructional issue.

Two arguments can be made in favor of multiple decoding strategies. First, there are limitations in each separate strategy. No single strategy is sufficient for all categories of words. By way of illustration, phonic approaches may not work when the orthography does not give a clear indication of the corresponding phonemes, e.g., <u>women</u>. Context as a clue is not always reliable either. Seldom is there only one particular word that best completes a sentence. Further, the use of context clues assumes that the other words surrounding the unknown word are known. Structural analysis, too, is not always practical. There are many instances where the new word is not a compound, a derivative, or a variant of a familiar word. Second, the use of a combination of strategies would provide more than one clue for each word to be recognized. For example, context clues may narrow the identification of

a word to burner, stove, or fire. Application of a graphophonic strategy would make identification certain.

This study was designed to determine whether or not there is a significant instructional advantage to using multiple word recognition strategies over single word recognition strategies. Information gained is useful to validate the selection of instructional approaches for word recognition.

The investigation of the transfer effect of word recognition strategies was significant for two reasons. First, classroom instructional practices are more effective when teachers are given direction and validated theories for their teaching activities. This study provides information useful to the selection of materials and programs for teaching pupils of diverse learning backgrounds and styles. Second, the inclusion of information from this investigation in the elementary teacher preparation course work at California Polytechnic State University in San Luis Obispo enriches and extends that course of study. This institution is committed to educational effectiveness. The training of teachers requires ongoing evaluations of instructional practice.

The purpose of the Research Methodology Seminar is to familiarize students with the application of research design and the use of research techniques to produce change in the environment in which they work. The intention of this study is to use a research design in accordance with the study guide for the Research Methodology Seminar. The information

generated from this investigation will be included in the revision of the Course of Study for Elementary Reading methods at California Polytechnic State University in San Luis Obispo.

Research Question

Does the teaching of multiple word recognition strategies contribute to the word recognition performance of pupils?

Hypotheses

Pupils taught multiple word recognition strategies (experimental group) will recognize more unknown printed words when compared to pupils (non-instructional control group) who are not taught these strategies.

The null hypothesis is that any difference between the means of the experimental and control groups is attributed to change at the .05 level of significance.

Chapter 2

REVIEW OF THE LITERATURE

Although there has long been controversy over how children best learn to perceive words in reading, the dispute has recently taken new directions. Twenty years ago the chief issue regarding how to teach word identification-recognition centered on "phonics versus whole words." In phonic methods, the sound correspondence of letters or groups of letters were to serve as auditory clues to word identification. Whole-word methods required the pupil to concentrate upon visual aspects of the word and simultaneously listen as the teacher pronounced it. The large number of studies comparing the efficiency of the methods reported varying results. Frequently, criticisms of the studies referred to the bias of the researcher who was eager to show the superiority of one technique over another rather than the unique contributions of each (Robinson, 1965; Durkin, 1981). Seldom did the investigators make clear whether they were trying to find the relative efficiency of the methods in helping a child (a) decode words never seen before or (b) enhance delayed recognition of words previously met.

Currently, theorists writing from a psycholinguistic viewpoint argue that words are best recognized on the basis

of their semantic and syntactic functions in a sentence. That is, it is thought that learners can guess what a word is by the thematic prompting of the written context and by the predicted ordering of words in English (Smith, 1988; Goodman, 1968). These theorists hold that there are easier ways of discovering what a word may be than sounding it out phonetically. They would have children either ignore a new word met in reading, decide from context what it must be, or make analogies with similar words or parts of words already known.

Empirical studies of how young children recognize words show that the word recognition process used is related to the method by which pupils are taught (Barr, 1974). For example, those taught by a sight word technique rely on a single cognitive structure stressing shape, length, beginning and ending parts of words, and their counterparts. Most learners taught by phonic approaches attempt to pronounce unfamiliar words by pronouncing a cluster of letters, not by "sounding out" individual letters nor by applying phonic rules (Glass and Burton, 1973). Although only a few children use contextual clues, these children are among the better readers (H. Klein, G. Klein, and Bertino, 1984). Indeed, one study reported that within a group of thirty children, five from each grade one through six, only seven percent (7%) used syntactic and semantic information in the decoding of unrecognized words (Tovey, 1976). Also, children who are the

most successful readers report that they use a variety of strategies, i.e., phonic analysis, manipulation of word parts, and structural analysis (Hardy, Stennett, and Smythe, 1973).

There are a number of publications that discuss combining one or more strategies for reading instruction (Kantrowitz, 1990; McCracken, 1987; Quinsey, 1990). However, these authors defend the subordinate role of phonics, context or whole-word strategies to a favored single approach to word recognition.

Kantrowitz supports the contextual approach, but admits the phonics method should not be completely abandoned; just limited to times when sounding out words seems appropriate. She also suggests that a structural approach may be more effective for learning-disabled or limited-experience children who might not understand context clues.

The notion that phonics instruction is necessary but of lower priority than context instruction is reinforced by McCracken:

> The essence of reading is to gain meaning from text, and children learn to read by reading. Therefore, we teach reading strategies through quality children's literature, rich in human meaning.... We believe phonics skills need to be taught in order for children to spell correctly and we incorporate these skills as the child is ready.

A statement from Quinsey puts the problem in perspective:

> The purpose is not one of whether phonics should be taught, but how it should be taught. The majority of phonics systems are not meaning centered, and cannot be adapted to any current literature program.

While recent literature debates the effectiveness of one word recognition strategy over another, there is a lack of information concerning the transfer effect of multiple word recognition strategies.

Chapter 3

METHODOLOGY AND PROCEDURES

A quasi-experimental problem solving methodology was used in this investigation.

Subjects

Ninety children, 30 from first, 32 from second, 32 from third, and 28 from fourth grade classrooms served as experimental subjects (41 boys; 49 girls). All the children were native speakers of English and their ability to read as indicated by the California Test of Basic Skills ranges from 1.0 to 9.9 grade levels. These children were randomly drawn from a larger school population. A like number of children were drawn to serve as non-instructional controls.

Measures

A 24-item word recognition test was individually administered four times to those in both the experimental and control groups (see Appendix A). The test was given as a pre-test and as an achievement measure after each transfer series of lessons treating a particular word recognition strategy. The items were transfer items. None of the items included words presented during instruction. The first nine items

matched the graphophonic principles taught; the second nine items were new instances of structural words involving compounds and two word form changes; the remaining items were contextual in that the unknown words were commonly spoken words with irregular spelling patterns (words of non-Anglo-Saxon origin). The clue words surrounding the unknown words were one-syllable words of high frequency. Twelve of the items presented featured unknown words in isolation. Three items in each of the first two categories of words presented the unknown word in context, and all unknown words in the third category were in context.

In all instances, children were asked to pronounce orally "the underlined words." Separate scores were obtained for each category of words.

The words of the tests differed from the words used in training in the following ways:

Phonics Test. Although three words began with wr consonant blend found in the training words, the remainder of the new words consisted of phonograms that never appeared in the training lesson, e.g., wrist.

Three of the words featured the oi digraph which was present in the words used in training. However, these three words featured a different initial and final consonant or consonant cluster, e.g., hoist.

Three of the words followed a consonant-vowel-consonant-vowel pattern that had been taught in training. However, these three words featured combinations of letters that never appeared in the words of the training program, e.g., sinus.

Structural Test. Three of the transfer words featured different base words than the words used in training. Only a doubled consonant and inflected ending were identical to the training words. Three other transfer words differed from the training words in that they, too, were composed of untaught base words. These transfer words and the words in training both featured the words from those whereby a y changes to i when there is a ly suffix, e.g., nastily. The remaining three items of the transfer text featured compound words with different base words than those in the training program.

Contextual Test. Words used in this test were selected from multiple syllabic words commonly used in oral communication but with irregular spelling patterns, e.g., foreigners. None of these words appeared in the training lessons. Although these transfer words always appeared in a sentence composed of high frequency words, the transfer word itself varied in its position within the sentence; sometimes it was the first word, and at

other times it was the middle or last word, e.g., Molasses is sticky.

Experimental children were grouped by grade level for instruction and taught by the same teacher. Three daily lessons, each of 20 minute duration, were presented for each of the strategies - a total of nine lessons. The order in which strategies were taught was: graphophonic, structural, and contextual. The day after the final lesson on a given strategy, the test was administered. There was an interval of four days after administration of the test and instruction on the remaining strategies.

Graphophonic lessons featured the following principles for letter/sound correspondence; (a) w is silent when followed by r; (b) when only one consonant follows a vowel, the word is divided after the first vowel. The consonant begins the second syllable, hence the first vowel ends a syllable and is a long vowel; and (c) the letters oi correspond to the sound of oi in oil. The lesson format included writing on the chalkboard the phonics pattern and five examples of the pattern in printed words. Each graphophonic lesson provided 15 opportunities for children to apply one of the graphophonic rules in fresh instances.

Structural lessons emphasized changes in word forms by doubling a final consonant and adding ed, dropping a final y and adding ly, and combining two root words to make a new word. The lessons gave pupils an opportunity both to identify

the bases from which given words were derived and to use base words in composing new words, e.g., "From what words were these words made?" - taped, begged, dotted and "Say these words" - mapped, logged.

Contextual lessons encouraged learners to guess all new words from what the other words in the sentence(s) suggest. The lessons commenced with oral practice in guessing missing words in sentences where the missing word was prompted by context. Subsequently, there was practice with written items that consisted of one or more sentences in which the unknown word preceded or followed high frequency sight words and prompts, e.g., "Read the sentence and then say the new word that is underlined."

a. The dog can bark. The bird can sing. The cat can meow.

b. Octopuses have a lot of arms.

Each of the three lessons dealing with the contextual strategy offered 15 opportunities to apply the strategy in new instances.

Definition of Terms

Graphophonic Analysis - recognizing printed words on the basis letter-sound correspondence in which particular spelling patterns appear with some regularity.

Structural Analysis - recognizing words on the basis of their structural parts - root or base words and their combinations and inflected endings.

Contextual Analysis - using syntax (word order) and semantics (word meaning) in context of a sentence to aid in the recognition of the unknown printed word.

Assumptions

The teachers presented the strategies equally well.

Pupils were equally motivated to respond to the different testing periods.

Limitations

The design of the study did not consider the relation of word recognition strategies to the comprehension of text. The fact that the contextual strategy was taught last might have produced a ceiling effect upon test performance, making more difficult the full generalization effect of this strategy.

Chapter 4

RESULTS

Table 1 displays the percentages of words correctly decoded before and after training in the separate word recognition strategies. It also reveals the percentage of correctly decoded words upon repeated testing by pupils in the non-instructional control group.

Inspection of Table 1 shows that training in the graphophonic strategy was effective in helping pupils decode words consistent with the principles taught, resulting in a 38% increase in correctly recognized words. Similarly, training in the structural strategy was associated with a 33% gain in correctly decoded structural words; training in the contextual strategy resulted in a 42% gain in recognition of contextual words. These three word recognition strategies tended to be specific to their respective classes of words rather than general. There was no decline in test scores in a given category after training in additional strategies. Children were more successful in decoding graphophonic words than words in other categories.

TABLE 1

Proportion of Types of Words Decoded as Related to Training
In Word Recognition Strategies

Training Group	Words		
	Graphophonic	Structural	Contextual
Pre-Knowledge			
Experimental Group	.39	.33	.24
Non-Instructional Group	.40	.34	.25
After Instruction in Phonic Strategy			
Experimental Group	.77	.34	.25
Non-Instructional Group	.42	.40	.20
After Instruction in Structural Analysis			
Experimental Group	.83	.67	.26
Non-Instructional Group	.43	.41	.20
After Instruction in Contextual Strategy			
Experimental Group	.85	.73	.68
Non-Instructional Group	.45	.41	.21

Analysis of performance by pupils of different grade levels revealed that second grade pupils had both lower pre- and post-test scores than children in the third and fourth grades. However, second grade pupils with training in the multiple strategies performed better in all categories of words than fourth grade pupils without training. Table 2 shows pre- and post-test scores of children at different grade levels in terms of number of words correctly recognized.

TABLE 2

Proportion of Words Decoded Before and After Training
By Children at Different Grade Levels

Level	Before Training	After Training
Second Grade Pupils	.15	.65
Third Grade Pupils	.31	.74
Fourth Grade Pupils	.54	.92

As seen in Table 3, which is based upon student scores as the unit of analysis, with one exception, significant differences were found between the control subjects and the experimental subjects at all grade levels following instruction in each of the three strategies. No significant differences were found on the pre-test. Hence, the null hypothesis that any difference between the means of the experimental and control groups is attributed to change is rejected.

TABLE 3

Mean Correct Responses, *SDs* (in parentheses), and *t* Values At Test Points for Each Group by Grade Level

Grade Level Group	Test Points			
	1	2	3	4
Second Grade Level				
Experimental Subjects	3.7	7.6	11.3	15.8
(N = 30)	(6.07)	(6.2)	(5.5)	(5.5)
Control Subjects	4.2	4.1	4.1	3.9
(N = 30)	(5.9)	(6.5)	(6.5)	(6.7)
	t = .3	t = 3.2**	t = 6.0**	t = 7.0**
Third Grade Level				
Experimental Subjects	7.5	11.4	15.1	18.1
(N = 32)	(7.3)	(6.04)	(4.0)	(4.4)
Control Subjects	8.4	8.6	8.8	9.1
(N = 29)	(7.5)	(7.4)	(7.4)	(7.2)
	t = .5	t = 1.8	t = 4.01**	t = 6.9**
Fourth Grade Level				
Experimental Subjects	12.7	15.3	18.7	21.1
(N = 29)	(6.3)	(4.89)	(4.07)	(3.9)
Control Subjects	11.9	12.03	12.5	12.8
(N = 32)	(7.2)	(7.3)	(7.1)	(7.3)
	t = .45	t = 2.06*	t = 4.13**	t = 5.5**

*$p < .05$
**$p < .01$

Chapter 5

DISCUSSION, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Discussion

The present data provides support for the efficacy of children learning multiple word recognition strategies. This is true with respect to children at several grade levels. The data are consistent with the psycholinguistic views of Smith (1973), Tovey (1976), and others who propose teaching multiple strategies - especially syntactic and semantic ones. However, the design of the study did not provide data bearing upon another concern of these theorists; namely, that a child may be locked into a single strategy which may be associated with initial success in the primary grades, but may cause great difficulty in later grades. The relation of various word recognition strategies to comprehension of text, for example, was not considered in the present study. Further, it should be noted that the fixed sequence for instruction in the strategies in which the contextual strategy was taught last, having a ceiling effect upon test performance, might have made it more difficult to show the full generalizable effect of this strategy upon graphophonic and structural words.

The transfer value of each of the strategies, however, has been shown. The graphophonic strategy enabled pupils to decode new words that followed phonic regularities, the structural strategy contributed to the child's ability to recognize unfamiliar words composed of given structural forms, and the contextual strategy was useful in decoding words with irregular spelling patterns.

Conclusions

Conclusions reached in this investigation are that word recognition can be efficiently taught through multiple strategies, and that these strategies will be effective at various grade levels. Each of the strategies makes a useful contribution.

Implications

The implication is that single strategies are less effective for teaching word recognition than multiple strategies. Teachers can improve instruction in word recognition by teaching pupils the three strategies. Additional study of how best to teach recognition strategies are in order. The study did not provide evidence of the effect of different sequential ordering of instruction and the introduction of lessons requiring the synthesizing of strategies in recognizing a variety of words of different categories.

Recommendations

Recommendations for the Center for Teacher Education at California Polytechnic State University in San Luis Obispo are that multiple strategies for word recognition should be included in the pre- and in-service reading methods courses for teachers, that research be conducted to determine the full generalizable effect of the contextual strategy, and that other lesson formats be designed to evaluate the integration of word recognition strategies.

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APPENDIX A

TRANSFER EFFECT DECODING TEST

Instruction	Visual
"Say these words."	wrist hoist sinus wrench soil lobe
"Read the sentence and then say the underlined word aloud."	He <u>wrote</u> on paper. Let's <u>join</u> them. The tent has a red <u>stripe</u>.
"Say these words."	nastily gunman drumming prettily hitting nosebleed
"Read the sentence and then say the underlined word aloud."	She broke her <u>hipbone</u>. They went <u>hastily</u>. The cat was <u>napping</u>.
"Read the sentence and then say the underlined word aloud."	The <u>foreigners</u> came by boat. She put <u>rouge</u> on her face. Her fish was <u>salmon</u>. She was <u>courageous</u> in war. A <u>giraffe</u> is tall with a long neck.